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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/743,379

12/23/2003

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24203 7590 04/03/2007  
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EXAMINER

KEMMERLE III, RUSSELL J

ART UNIT

PAPER NUMBER

1731

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/03/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/743,379

Applicant(s)

CHIKUGO, KAZUYOSHI

Examiner

Russell J. Kemmerle

Art Unit

1731

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) 3 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1, 2 and 4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vail (Ceramic Structures by Selective Laser Sintering of Microencapsulated, Finely Divided Ceramic Materials) in view of Osawa (US Patent 5,702,501).

Vail discloses a method of selective laser sintering a polymer coated ceramic powder in order to form a ceramic green article (pp 125-126), and infiltrating the green article with a ceramic cement and then firing the infiltrated green article (page 126). Specifically mentioned is the use of oxide ceramics (specifically silica, zircon and alumina) (pg 125). Vail further discloses using a ceramic cement that is primarily colloidal silica, or a silica/alumina mixture (page 125 and Table 3).

Vail further discloses that after infiltrating the sample with a ceramic cement, the samples are dried, polymer binders are removed, and infiltrated samples are fired at high temperatures up to around 1000°C (page 126 and Fig. 1).

Vail does not disclose that the samples are fired in an atmosphere of 1100°C or more, or that the impregnated core is placed in a heat resistant powder during firing.

It would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to have modified the method disclosed by Vail of firing infiltrated oxide ceramic articles at 1000°C by firing the samples at 1100°C or higher. This would have been obvious because one skilled in the art would know that while 1000°C is

generally sufficient for treatment of a silica sol as discussed in Vail, for other materials such as alumina sol a temperature of at least 1100°C is required to convert the sol to  $\alpha$ -alumina (see, Gonczy, US Patent 4,615,875 Col 4 lines 58-60 disclosing that unseeded alumina sol must be heated to 1200°C to effect phase transformation to  $\alpha$ -alumina).

Osawa discloses a method of burying an article in a ceramic powder during heating and sintering to prevent the article from deforming (Col 2 lines 23-44).

It would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to have modified the method taught Vail of using selective laser sintering to form a ceramic article, by using the method disclosed by Osawa of firing an article while it is buried in a ceramic powder in order to prevent the article from deforming during firing.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vail in view of Osawa Langer (6,155,331).

Vail in view of Osawa is relied upon as discussed above, but fails to teach a super-alloy precision cast product made from the ceramic article produced in the manner discussed above.

Langer discloses a method for creating a ceramic core by selective laser sintering a resin coated ceramic powder, and subsequently using that core to cast parts of molten metal (Col 1 lines 4-6, Col 2 lines 26-42, Claims 1, 4, 6-7, 19-20).

It would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to have modified the method disclosed by Vail in view of Osawa of creating a ceramic article by selective laser sintering a polymer coated ceramic

powder to create an article of a desired shape, infiltrating that article with a ceramic cement, and then firing the article with the method taught by Langer of using a ceramic article created by selective laser sintering a resin coated ceramic powder to create casts of molten metal since Langer discloses that this is an effective use for a product created by such a process. Such a cast would obviously be effective as a super-alloy precision cast since Vail discloses that the products made by that method exhibit high thermal resistance, and selective laser sintering is a very precise method which creates articles with very tight tolerances.

### ***Response to Arguments***

Applicant's arguments filed 16 January 2007 that Vail fails to teach the claimed invention have been fully considered but they are not persuasive.

Applicant argues that Vail does not teach sintering after impregnation, and that Vail fires at no more than 400°C, and specifically does not teach heating to 1100°C. As discussed above, Vail teaches the steps of selective laser sintering a ceramic core, followed by infiltration of the core with a ceramic sol, followed by firing at around 1000°C to finish forming the ceramic article. While Vail does not specifically disclose firing at 1100°C or above, that is because Vail is working with silica sol, which only needs to be heated to 1000°C in their treatment, if one were to use alumina sol (an obvious substitute for silica sol), those skilled in the art know that the alumina sol must be heated above 1100°C to effect a phase change to  $\alpha$ -alumina, as shown above in Gonczy)

Applicant's arguments that Osawa is not directed to analogous art and therefore not combinable for a rejection under 35 U.S.C. 103 has been considered but is not found to be persuasive. Osawa is directed toward a method of preventing deformation of a ceramic article during sintering, which would be relevant in the current invention's field of endeavor, and thus combinable for a rejection under 35 U.S.C. §103.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell J. Kemmerle whose telephone number is 571-272-6509. The examiner can normally be reached on Monday through Friday, 8:30-4:00 EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RJK

  
STEVEN P. GRIFFIN  
SUPERVISORY PATENT EXAMINER  
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